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### (54) PRODUCTION OF GALVANIZING-COATED STEEL SHEET EXCELLENT IN FINGERPRINT RESISTANCE AND GLOSINESS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for producing a galvanizing-coated steel sheet excellent in fingerprint resistance and glossiness after galvanizing and coating.

SOLUTION: The product of the filter center line waviness WCA (mm) on the surface of a cold rolled steel sheet and the number of crests PPI per inch is regulated to  $\leq 40$ , preferably, the WCA is regulated to  $\leq 0.5$ mm and the PPI to  $\leq 80$ , and the steel sheet is galvanized, which is moreover subjected to chromate treatment and is coated with an organic resin film. As for the surface state, at the time of subjecting the hot rolled steel sheet to cold rolling, at least in the final pass in the rolling, it is executed using a rolling roll in which the WCA and PPI on the surface are controlled.

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ABSTRACT:

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SOLUTION: The product of the filter center line waviness WCA (mm) on the surface of a cold rolled steel sheet and the number of crests PPI per inch is regulated to  $\leq 40$ , preferably, the WCA is regulated to  $\leq 0.5$ mm and the PPI to  $\leq 80$ , and the steel sheet is galvanized, which is moreover subjected to chromate treatment and is coated with an organic resin film. As for the surface state, at the time of subjecting the hot rolled steel sheet to cold rolling, at least in the final pass in the rolling, it is executed using a rolling roll in which the WCA and PPI on the surface are controlled.

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CLAIMS

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[Claim(s)]

[Claim 1] the front face of a hot-dip-zincing negative -- the wave filtration center line on this front face of a negative -- the manufacture approach of a hot-dip-zincing paint steel plate excellent in the fingerprint-proof nature and the glossiness which are characterized by giving hot dip zincing to this negative, performing chromate treatment further, and applying an organic resin coat after adjusting so that the product of a wave WCA (micrometer) and the threads per inch PPI per inch may become 40 or less.

[Claim 2] the wave filtration core on said front face of a negative -- wave WCA (micrometer) 0.5 micrometers The manufacture approach of a hot-dip-zincing paint steel plate excellent in the fingerprint-proof nature and the glossiness according to claim 1 which are hereafter characterized by the threads per inch PPI per inch being 80 or less.

[Claim 3] It considers as the cold rolled sheet steel which cold-rolls a hot rolled steel plate and has predetermined board thickness. Subsequently In the manufacture approach of the hot-dip-zincing paint steel plate which performs hot dip zincing and chromate treatment, and applies an organic resin coat Said cold rolling is faced and it is Ra to the last pass of at least rolling. : 1 micrometer Following, WCA : 1.5 micrometers The manufacture approach of a hot-dip-zincing paint steel plate excellent in the fingerprint-proof nature and the glossiness according to claim 1 or 2 which are characterized by rolling out hereafter using the reduction roll which is less than [ PPI:200 ].

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of a hot-dip-zincing paint steel plate excellent in fingerprint-proof nature and glossiness.

[0002]

[Description of the Prior Art] Since the corrosion resistance is excellent, the hot-dip zinc-coated carbon steel sheet is used for broad applications, such as an automobile, a home electrical-and-electric-equipment product, or building materials. A hot-dip zinc-coated carbon steel sheet came to be used for many parts of the electric product which especially paints the chassis of a home electrical-and-electric-equipment product etc. recently. Although its coating adhesion is bad if a hot-dip zinc-coated carbon steel sheet remains as it is, and chemical conversion, such as phosphate processing and chromate treatment, is generally performed, the coating adhesion which was excellent with alloying processing is acquired.

[0003] With the shell plate for automobiles, and a home electrical-and-electric-equipment product, it is required that the glossiness after paint and fingerprint-proof nature should be excellent in addition to corrosion resistance and the adhesion of a coating. However, when chromate treatment was performed to the hot-dip zinc-coated carbon steel sheet and organic resin was subsequently painted, compared with the case where it paints directly, the problem that fingerprint-proof nature and glossiness deteriorated remarkably was in cold rolled sheet steel (negative). As for the surface engine performance after these paint, the improvement of a coating and the method of application has mainly been conventionally considered briskly as a technical problem of a paint technique. However, in paint of high quality, only by the coating or the method of application, there is a limitation and being influenced by the surface roughness of a steel plate is becoming clear.

[0004] For example, the manufacture approach of a surface treated steel sheet that the image clarity after paint was excellent is proposed by JP,6-75728,B. This technique is surface roughness Ra 0.4micrometer of a surface treated steel sheet negative. After galvanizing by controlling to the following and 100 or less PPI, temper rolling is performed and the image clarity of a surface treated steel sheet is improved. Moreover, in JP,5-83628,B, it is the surface roughness Ra of a plating negative. 1.0 micrometers It considers as the following and the melting alloying galvanized steel sheet which controlled the surface roughness PPI of a plating layer or more to 250, and has improved powdering-proof nature and flaking-proof nature further is indicated.

[0005] However, each of these must control the surface roughness of a plating negative, and the surface roughness of a plating layer, and becomes complicated also in process. Moreover, with the above-mentioned technique, the technique of these properties which became high and was described above is [ the fingerprint-proof nature which it came to take into consideration, and the demand to glossiness ] still inadequate, and the further improvement was demanded recently.

[0006]

[Problem(s) to be Solved by the Invention] This invention aims at proposing the manufacture approach



of a hot-dip-zincing paint steel plate excellent in the fingerprint-proof nature after giving and painting hot dip zincing, and glossiness.

[0007]

[Means for Solving the Problem] this invention persons found out that the surface state of the cold rolled sheet steel which is a hot-dip-zincing negative had influenced greatly, as a result of examining \*\*\*\*\* various factors wholeheartedly to the fingerprint-proof nature after paint of a hot-dip zinc-coated carbon steel sheet, and glossiness. Drawing 1 is the experimental result which this invention persons searched for. (a) is the relation between the fingerprint-proof nature after paint of a hot-dip zinc-coated carbon steel sheet, and the color tone after paint, fingerprint-proof nature has the close relation to a color tone (L value), and in order to make fingerprint-proof nature into fitness ( $\Delta L$  value  $\leq 1$ ), it needs to make a color tone (L value) 42 or less. (b) is the relation between the color tone after paint (L value), and the glossiness after paint ( $G'$ ), and a good correlation exists. (c) is the relation between the glossiness after paint ( $G'$ ), and the glossiness (G) of cold rolled sheet steel (negative), and a good correlation exists similarly. (d) is the glossiness (G) of cold rolled sheet steel (negative), and the relation of the WCAxPPI value of cold rolled sheet steel (negative), and good correlation is accepted. It found out being improved by this invention persons' making the WCAxPPI value of cold rolled sheet steel (negative) as the fingerprint-proof nature after paint, and making glossiness or less into 40, and this invention consisted of above-mentioned experimental results.

[0008] this invention -- the cold-rolled-sheet-steel front face of a hot-dip-zincing negative -- the wave filtration center line on this front face of a negative -- after adjusting so that the product of a wave WCA (micrometer) and the threads per inch PPI per inch may become 40 or less, it is the manufacture approach of a hot-dip-zincing paint steel plate excellent in the fingerprint-proof nature and the glossiness which are characterize by giving hot dip zincing to this negative, performing chromate treatment further, and applying an organic resin coat. Furthermore, WCA on this front face of a negative 0.5 micrometers As for the following and PPI, 80 or less are desirable. Moreover, this invention faces [ cold-rolling and ] a hot rolled steel plate, and is Ra to the last pass of at least rolling. : 1 micrometer The following, WCA: 1.5 micrometers It is suitable to roll out hereafter using the reduction roll which is less than [ PPI:200 ].

[0009]

[Embodiment of the Invention] The surface state of a hot-dip-zincing negative is controlled by this invention. the front face of a negative -- a wave filtration center line -- it asks for the number PPI of the crests per inch called for from a wave WCA (micrometer) and a cross-section granularity curve, and those product WCAxPPI controls to become 40 or less.

[0010] In this invention, it is not WCA and PPI independent, and it is most important to make these product WCAxPPI or less into 40. If WCAxPPI exceeded 40, since fingerprint-proof nature and glossiness would deteriorate, it considered as the upper limit. In addition, WCA is 0.5. mum Considering as the following is suitable from fingerprint-proof nature and an glossy viewpoint. Moreover, also as for PPI, 80 or less are desirable from fingerprint-proof nature and an glossy viewpoint.

[0011] here -- WCA (micrometer) -- JIS the wave filtration center line specified to B0610 -- a wave -- expressing -- the high region cut-off value of 8mm, and low-pass cut-off value It is the value calculated by 0.8mm. Moreover, PPI is the cut-off value of 1.25 micrometers. It is the value which shows the total number of the crest per inch about the irregularity of the above cross-section (two dimensions) granularity curve. WCA and PPI are controlled by the reduction roll to be used, when cold-rolling a hot rolled steel plate. It is Ra about the reduction roll to be used. : 1 micrometer The following, WCA: 1.5 micrometers It considers as the roll not more than PPI:200 hereafter. processing of a reduction roll -- shot dull and laser dull processing -- all are suitable.

[0012] The above-mentioned roll is good to use it by the ultimate-pressure total of cold rolling at least. Thereby, WCAxPPI of a cold rolled steel plate (hot-dip-zincing negative) can attain 40 or less. In this invention, after making a hot rolled steel plate into predetermined board thickness with cold rolling, it is immersed in a melting zinc bath and galvanizes on a cold rolled steel plate front face (it heats after plating and alloys.). In order to raise corrosion resistance and coating adhesion on a plating layer,

chromate treatment is performed and an organic resin coat is applied further.

[0013] Each well-known condition can usually apply suitably the presentation of a melting zinc bath, temperature, immersion time amount, etc. Chromate treatment is performed after plating. Although chromate treatment has the spray approach which rinses and dries, and the electrolysis approach which immerse for it and electrolyze a plating steel plate into chromate-treatment liquid after carrying out the spray of the dipping former and the chromate-treatment liquid which rinse the method of application which can be dried or burned after applying chromate-treatment liquid to a plating front face by a roll coater etc., or a steel plate with plating after immersed in chromate-treatment liquid, and dry, it chooses suitably by the quality and the processing facility which make into the purpose, and it can use. As for the typical presentation, the chromic anhydride containing a cryolite (etching agent) is known, and chromate treatment liquid can apply well-known processing liquid in this invention.

[0014] After carrying out chromate treatment, an organic resin coat is formed. The formation approach of an organic resin coat can apply well-known approaches, such as spreading and a roll coater. Although the organic resin which can be used by this invention can be chosen according to the quality and the service condition which are made into the purpose, it is suitable for it to use polyester resin, an epoxy resin, acrylic resin, urethane resin, etc. especially. Coverage of an organic resin coat 0.1-3 micrometers Extent is desirable.

[0015]

[Example] Board thickness 5.5mm hot rolled sheet steel was used as the cold rolled sheet steel of 1.6mm thickness with cold rolling. Cold rolling was made into board thickness predetermined with five pass. Only pass was cold-rolled using the reduction roll which is shown in Table 1 and with which Ra and WCA differ from PPI (cut-off value of 1.25 micrometers) a ultimate-pressure total. The rolling draft at that time could be 70%.

[0016] The surface state of the steel plate obtained by the above-mentioned cold rolling is shown in Table 1. These cold rolled sheet steel It is immersed in a 470-degree C melting zinc bath, and is one side 40 g/m<sup>2</sup>. Or 60 g/m<sup>2</sup> It galvanized to both sides. Subsequently, it is desiccation thickness about the coating which carries out spray processing in chromate treatment liquid, performs chromate treatment to a plating steel plate, and contains lubrication resin on the obtained steel plate. 0.1 micrometers It painted and carried out by the ability being burned so that it might become.

[0017] The glossiness and fingerprint-proof nature of the obtained hot-dip-zincing paint steel plate were investigated.

(1) The surface state of a surface roughness measurement negative was measured by measurement die length of 8mm with the 2-dimensional sensing-pin type granularity measuring device. WCA, Ra, and PPI are JIS. B0610, JIS It measured and calculated according to B0601. Ra the average of roughness height -- it is -- WCA (micrometer) -- JIS the wave filtration center line specified to B0610 -- a wave -- expressing -- the high region cut-off value of 8mm, and low-pass cut-off value It is the value calculated by 0.8mm. Moreover, PPI is the cut-off value of 1.25 micrometers. It is the value which shows the total number of the crest per inch about the irregularity of the above cross-section (two dimensions) granularity curve.

(2) About the glossiness of the steel plate after glossiness measurement paint, it is JIS by the specular gloss measuring device. According to Z8741, by the incident angle specified to the sample side, incidence of the flux of light of a regular aperture angle was carried out, the flux of light of the aperture angle of the convention reflected in the direction of specular reflection was measured by the electric eye, and G value was calculated. In this invention, G value made 300 or more A (O), and less than 300 and 200 or less were made into good (\*\*), and it made less than 200 C (x).

(3) the fingerprint-proof nature of the steel plate after fingerprint-proof nature measurement paint -- a spectrum -- a colorimeter -- JIS It measured according to Z8730 and deltaL value was calculated. In this invention, deltaL made A (O) and 1 super-\*\* C (x) or less for one.

[0018] A measurement result is shown in Table 1. Although the glossiness after paint and fingerprint-proof nature are excellent in steel plate No.1-4 of the example of this invention, steel plate No.5 which are an example of a comparison have large WCA, and since WCA and WCAxPPI separate from the

range of this invention, glossiness and fingerprint-proof nature have deteriorated.  
[0019]

[Table 1]

鋼板 No	最終圧延ロール			冷延鋼板			溶融亜鉛 めっき 目付量 g/m <sup>2</sup>	塗料塗布量 μm	塗装鋼板				備 考
	R <sub>a</sub> μm	W <sub>CA</sub> μm	PPI 個/in	W <sub>CA</sub> μm	PPI 個/in	W <sub>CA</sub> × PPI			光沢度 G値	判定	耐指紋性 ΔL	判定	
1	1	1.3	200	0.4	80	32	40/40	0.5	320	○	0	○	本発明例
2	1	1.3	200	0.5	60	30	60/60	0.5	380	○	-2.0	○	本発明例
3	1	1.3	200	0.4	60	24	40/40	0.5	380	○	0.8	○	本発明例
4	1	1.3	200	0.5	80	40	60/60	0.5	300	○	0.9	○	本発明例
5	1	2.0	250	0.8	80	64	60/60	0.5	200	×	4.0	×	比較例

[0020]  
[Effect of the Invention] According to this invention, even if it paints by obtaining the cold rolled sheet steel for hot dip zincing excellent in the fingerprint-proof nature after paint, and glossiness, the hot-dip-zincing paint steel plate excellent in fingerprint-proof nature and glossiness is stabilized, it can manufacture, and great effectiveness is brought about on industry.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the graph which shows WCaxPPI on the front face of cold rolled sheet steel, and the relation of the fingerprint-proof nature after paint, and glossiness.

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(54)【発明の名称】 耐指紋性および光沢性に優れた熔融亜鉛めっき塗装鋼板の製造方法

(57)【要約】

【課題】 耐指紋性および光沢性に優れた熔融亜鉛めっき塗装鋼板の製造方法を提案する。

【解決手段】 冷間圧延鋼板表面のろ波中心線うねり $W_{CA}$ ( $\mu m$ )と1インチあたりの山数 $PP I$ の積が40以下とし、さらに好ましくは、 $W_{CA}$ を $0.5\mu m$ 以下、 $PP I$ を80以下として、該鋼板に熔融亜鉛めっきを施し、さらに、クロメート処理を施し、有機樹脂被膜を塗布する。表面状態は、熱間圧延鋼板を冷間圧延を施すに際し、少なくとも圧延の最終パスを表面の $W_{CA}$ 、 $PP I$ を制御した圧延ロールを用いて圧延する。

## 【特許請求の範囲】

【請求項1】 溶融亜鉛めっき原板の表面を、該原板表面のろ波中心線うねり $W_{Ca}$  ( $\mu m$ ) と1インチあたりの山数PPIの積が40以下となるように調整したのち、該原板に溶融亜鉛めっきを施し、さらに、クロメート処理を施し、有機樹脂被膜を塗布することを特徴とする耐指紋性および光沢性に優れた溶融亜鉛めっき塗装鋼板の製造方法。

【請求項2】 前記原板表面のろ波中心うねり $W_{Ca}$  ( $\mu m$ ) が  $0.5\mu m$  以下、1インチあたりの山数PPIが80以下であることを特徴とする請求項1記載の耐指紋性および光沢性に優れた溶融亜鉛めっき塗装鋼板の製造方法。

【請求項3】 熱間圧延鋼板を冷間圧延を施し所定の板厚を有する冷延鋼板とし、ついで、溶融亜鉛めっきおよびクロメート処理を施し有機樹脂被膜を塗布する溶融亜鉛めっき塗装鋼板の製造方法において、前記冷間圧延に際し、少なくとも圧延の最終パスに、 $R_a: 1\mu m$  以下、 $W_{Ca}: 1.5\mu m$  以下、PPI: 200以下である圧延ロールを用いて圧延することを特徴とする請求項1又は2記載の耐指紋性および光沢性に優れた溶融亜鉛めっき塗装鋼板の製造方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、耐指紋性および光沢性に優れた溶融亜鉛めっき塗装鋼板の製造方法に関する。

## 【0002】

【従来の技術】溶融亜鉛めっき鋼板は、その耐食性が優れていることから、自動車、家庭電気製品あるいは建材など幅広い用途に利用されている。とくに最近では、家庭電気製品のシャーシー等の塗装を行う電気製品の多くの部位に、溶融亜鉛めっき鋼板が使用されるようになった。溶融亜鉛めっき鋼板は、そのままでは塗料密着性が悪く、一般にリン酸塩処理、クロメート処理等の化成処理が施されるが、合金化処理によっても優れた塗料密着性が得られている。

【0003】自動車用外板、家庭電気製品では、耐食性、塗料の密着性以外に、塗装後の光沢性、耐指紋性が優れていることが要求される。しかし、溶融亜鉛めっき鋼板にクロメート処理を施し、ついで有機樹脂を塗装すると、冷延鋼板（原板）に直接塗装した場合に比べ、耐指紋性、光沢性が著しく劣化するという問題があった。これら塗装後の表面性能は、従来、主に塗装技術の課題として、塗料、塗装方法の改善が盛んに検討されてきた。しかし、高品質の塗装においては、塗料や塗装方法のみでは限界があり、鋼板の表面粗度にも影響されることが明らかになってきた。

【0004】たとえば、特公平6-75728号公報には、塗装後の鮮映性が優れた表面処理鋼板の製造方法が

提案されている。この技術は、表面処理鋼板原板の表面粗度 $R_a$   $0.4\mu m$  以下およびPPI100以下に制御し、めっきを施したのち、調質圧延を行い表面処理鋼板の鮮映性を改善するものである。また、特公平5-83628号公報には、めっき原板の表面粗度 $R_a$  を  $1.0\mu m$  以下とし、さらに、めっき層の表面粗度PPIを250以上に制御して耐パウダリング性、耐フレーキング性を改善した溶融合金化亜鉛めっき鋼板が開示されている。

【0005】しかし、これらはいずれも、めっき原板の表面粗度およびめっき層の表面粗度を制御しなければならず、工程的にも複雑となる。また、最近では、上記技術では考慮されていなかった耐指紋性、光沢性への要求が高くなり、上記した技術では、これら特性はまだ不十分であり、さらなる改善が要望されていた。

## 【0006】

【発明が解決しようとする課題】本発明は、溶融亜鉛めっきを施し塗装した後の耐指紋性および光沢性に優れた溶融亜鉛めっき塗装鋼板の製造方法を提案することを目的とする。

## 【0007】

【課題を解決するための手段】本発明者らは、溶融亜鉛めっき鋼板の塗装後の耐指紋性および光沢性におよぼす各種要因について鋭意検討した結果、溶融亜鉛めっき原板である冷延鋼板の表面状態が大きく影響していることを見いだした。図1は、本発明者らが求めた実験結果である。(a)は、溶融亜鉛めっき鋼板の塗装後の耐指紋性と塗装後の色調の関係であり、耐指紋性は色調(L値)と密接な関係があり、耐指紋性を良好( $\Delta L$ 値 $\leq 1$ )にするためには、色調(L値)は42以下とする必要がある。(b)は塗装後の色調(L値)と塗装後の光沢度( $G'$ )の関係であり、良い相関関係が存在する。

(c)は、塗装後の光沢度( $G'$ )と冷延鋼板（原板）の光沢度( $G$ )の関係であり、同様に良い相関関係が存在する。(d)は、冷延鋼板（原板）の光沢度( $G$ )と冷延鋼板（原板）の $W_{Ca} \times PPI$ 値の関係であり、良い相関が認められる。上記実験結果から、本発明者らは、塗装後の耐指紋性、光沢度は、冷延鋼板（原板）の $W_{Ca} \times PPI$ 値を40以下とすることにより改善されることを見だし、本発明を構成した。

【0008】本発明は、溶融亜鉛めっき原板の冷延鋼板表面を、該原板表面のろ波中心線うねり $W_{Ca}$  ( $\mu m$ ) と1インチあたりの山数PPIの積が40以下となるように調整したのち、該原板に溶融亜鉛めっきを施し、さらに、クロメート処理を施し、有機樹脂被膜を塗布することを特徴とする耐指紋性および光沢性に優れた溶融亜鉛めっき塗装鋼板の製造方法である。さらに、該原板表面の $W_{Ca}$ は  $0.5\mu m$  以下、PPIは80以下が好ましい。また、本発明は、熱間圧延鋼板を冷間圧延を施すに際し、少なくとも圧延の最終パスに、 $R_a: 1\mu m$  以下、

W<sub>CA</sub>: 1.5 $\mu$ m 以下、PPI: 200以下である圧延ロールを用いて圧延することが好適である。

#### 【0009】

【発明の実施の形態】本発明では、溶融亜鉛めっき原板の表面状態を制御する。原板の表面について、ろ波中心線うねりW<sub>CA</sub>( $\mu$ m)と断面粗さ曲線から求められる1インチあたりの山の数PPIを求め、それらの積W<sub>CA</sub>×PPIが、40以下となるように制御する。

【0010】本発明では、W<sub>CA</sub>、PPI単独でなく、これらの積W<sub>CA</sub>×PPIを40以下にすることが最も重要である。W<sub>CA</sub>×PPIが40を超えると、耐指紋性、光沢性が劣化するため、上限とした。なお、W<sub>CA</sub>は、0.5 $\mu$ m 以下とすることが、耐指紋性、光沢性の観点から、好適である。また、PPIも、耐指紋性、光沢性の観点から80以下が好ましい。

【0011】ここで、W<sub>CA</sub>( $\mu$ m)は、JIS規格 B0610に規定されるろ波中心線うねりを表し、高域カットオフ値8mm、低域カットオフ値0.8mmで求めた値である。また、PPIは、カットオフ値1.25 $\mu$ m 以上の(二次元)断面粗さ曲線の凹凸に関し、1インチあたりの山の合計数を示す値である。W<sub>CA</sub>、PPIは、熱間圧延鋼板を冷間圧延するときに、使用する圧延ロールで制御する。使用する圧延ロールをR<sub>a</sub>: 1 $\mu$ m 以下、W<sub>CA</sub>: 1.5 $\mu$ m 以下、PPI: 200以下のロールとする。圧延ロールの加工はショットダル、レーザーダル加工いずれも好適である。

【0012】上記ロールは少なくとも、冷間圧延の最終圧延で使用するとよい。これにより、冷間圧延鋼板(溶融亜鉛めっき原板)のW<sub>CA</sub>×PPIは40以下を達成できる。本発明においては、熱間圧延鋼板を冷間圧延により所定の板厚としたのち、溶融亜鉛浴に浸漬し、冷間圧延鋼板表面にめっきを施す(めっき後、加熱し合金化する。)。めっき層の上に耐食性と塗料密着性を向上させるため、クロメート処理を施し、さらに、有機樹脂被膜を塗布する。

【0013】溶融亜鉛浴の組成、温度、浸漬時間等は通常、公知の条件がいずれも好適に適用できる。めっき後に、クロメート処理を施す。クロメート処理は、クロメート処理液をめっき表面にロールコート等で塗布したのち乾燥または焼き付ける塗布方法、あるいは、めっき付き鋼板をクロメート処理液に浸漬したのち水洗し乾燥する浸漬方法、クロメート処理液をスプレーしたのち水洗し乾燥するスプレー方法、クロメート処理液中にめっき鋼板を浸漬し電解する電解方法があるが、目的とする品質、処理設備により適宜選択し利用できる。クロメート処理液は、代表的組成は、氷晶石(エッチング剤)入り無水クロム酸が知られており、本発明では、公知の処理液が適用可能である。

【0014】クロメート処理したのち、有機樹脂被膜を形成する。有機樹脂被膜の形成方法は、塗布、ロールコ

ータ等公知の方法が適用できる。本発明で利用できる有機樹脂は、目的とする品質、使用条件により選択できるが、中でもポリエステル樹脂、エポキシ樹脂、アクリル樹脂、ウレタン樹脂等を用いるのが好適である。有機樹脂被膜の塗布量は0.1~3 $\mu$ m 程度が好ましい。

#### 【0015】

【実施例】板厚5.5mmの熱延鋼板を、冷間圧延により、1.6mm厚の冷延鋼板とした。冷間圧延は、5パスで所定の板厚とした。最終圧延パスのみ、表1に示す、R<sub>a</sub>、W<sub>CA</sub>、PPI(カットオフ値1.25 $\mu$ m)の異なる圧延ロールを用いて、冷間圧延した。その時の圧下量は70%とした。

【0016】上記した冷間圧延により得られた鋼板の表面状態を表1に示す。これら冷延鋼板を470℃の溶融亜鉛浴に浸漬し、片面40g/m<sup>2</sup>あるいは60g/m<sup>2</sup>のめっきを両面に施した。ついで、クロメート処理液中でスプレー処理して、めっき鋼板にクロメート処理を施し、得られた鋼板の上に、潤滑樹脂を含有する塗料を、乾燥膜厚で0.1 $\mu$ mになるよう塗装、焼き付けした。

【0017】得られた溶融亜鉛めっき塗装鋼板の光沢度と、耐指紋性を調査した。

#### (1) 表面粗さ測定

原板の表面状態は、触針式二次元粗さ測定装置により、測定長さ8mmで測定した。W<sub>CA</sub>、R<sub>a</sub>、PPIは、JIS規格 B0610、JIS規格 B0601にしたがい測定・計算した。R<sub>a</sub>は平均粗さであり、W<sub>CA</sub>( $\mu$ m)は、JIS規格 B0610に規定されるろ波中心線うねりを表し、高域カットオフ値8mm、低域カットオフ値0.8mmで求めた値である。また、PPIは、カットオフ値1.25 $\mu$ m 以上の(二次元)断面粗さ曲線の凹凸に関し、1インチあたりの山の合計数を示す値である。

#### (2) 光沢度測定

塗装後の鋼板の光沢度を、鏡面光沢度測定装置により、JIS Z8741にしたがい、試料面に、規定された入射角で、規定の開き角の光束を入射し、鏡面反射方向に反射する規定の開き角の光束を受光器で測定し、G値を求めた。本発明では、G値が300以上を優(○)とし、300未満、200以下を良(△)、200未満を可(×)とした。

#### (3) 耐指紋性測定

塗装後の鋼板の耐指紋性を、分光測色計により、JIS Z8730にしたがって測定し、 $\Delta L$ 値を求めた。本発明では、 $\Delta L$ が1以下を優(○)、1超えを可(×)とした。

【0018】測定結果を表1に示す。本発明例の鋼板No. 1~4は、塗装後の光沢度、耐指紋性ともに優れているが、比較例である鋼板No. 5は、W<sub>CA</sub>が大きく、W<sub>CA</sub>およびW<sub>CA</sub>×PPIが本発明の範囲をはずれるため、光沢性、耐指紋性が劣化している。

【0019】

＊ ＊ 【表1】

鋼板No	最終圧延ロール			冷延鋼板			熔融亜鉛めっき目付量 g/m <sup>2</sup>	塗料塗布量 μm	塗装鋼板				備考
	R <sub>a</sub> μm	W <sub>CA</sub> μm	PPI 個/in	W <sub>CA</sub> μm	PPI 個/in	W <sub>CA</sub> ×PPI			光沢度 G値	判定	耐指紋性 ΔL	判定	
1	1	1.3	200	0.4	80	32	40/40	0.5	320	○	0	○	本発明例
2	1	1.3	200	0.5	60	30	60/60	0.5	380	○	-2.0	○	本発明例
3	1	1.3	200	0.4	60	24	40/40	0.5	380	○	0.8	○	本発明例
4	1	1.3	200	0.5	80	40	60/60	0.5	300	○	0.9	○	本発明例
5	1	2.0	250	0.8	80	64	60/60	0.5	200	×	4.0	×	比較例

【0020】

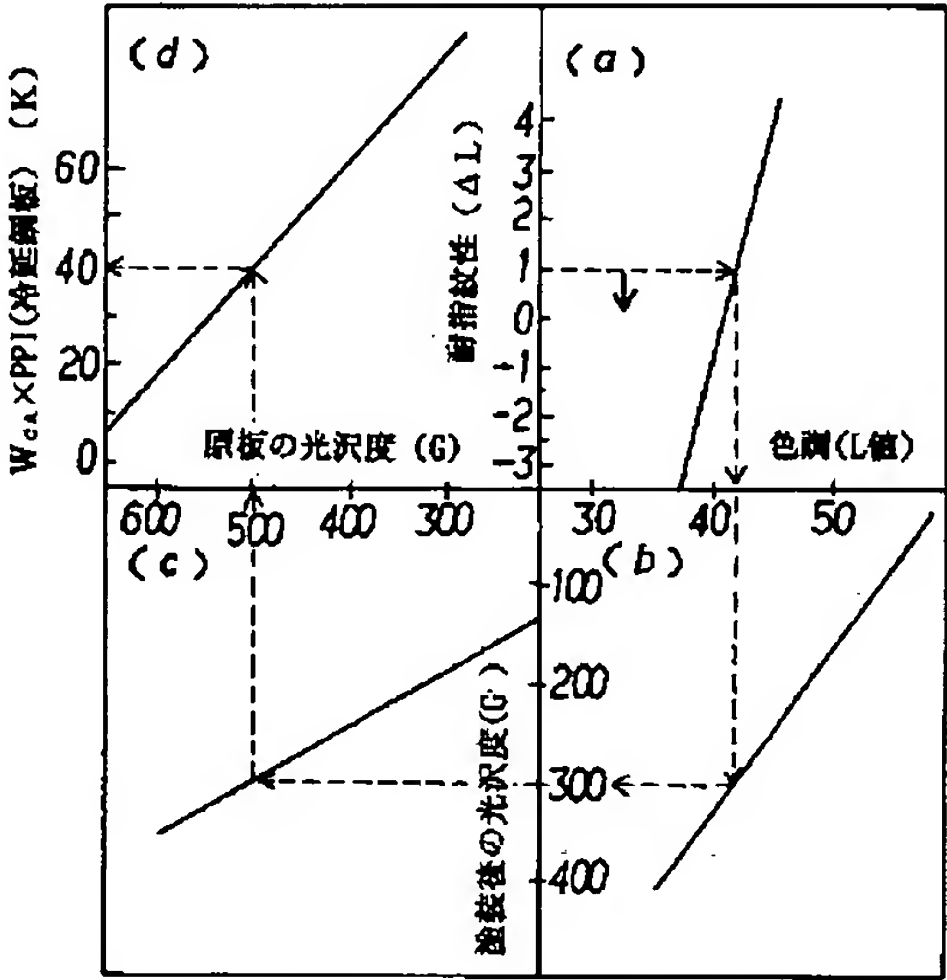
※大な効果をもたらす。

【発明の効果】本発明によれば、塗装後の耐指紋性および光沢性がすぐれた熔融亜鉛めっき用冷延鋼板が得られ、塗装を施しても、耐指紋性および光沢性に優れた熔融亜鉛めっき塗装鋼板が安定して製造でき、産業上、多※

【図面の簡単な説明】

【図1】冷延鋼板表面のW<sub>CA</sub>×PPIと、塗装後の耐指紋性、光沢度の関係を示すグラフである。

【図1】



フロントページの続き

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